

Remarks

Improper Final Rejection

Applicants urge that for the reasons given herein, no *prima facie* obviousness has been established, and therefore the current Final rejection is improper. Applicants respectfully request that the Final rejection be withdrawn.

Rejections Under 35 U.S.C. Section 103(a)

The claims stand rejected under 35 U.S.C. Section 103(a) as being unpatentable over Igarashi, U.S. Patent No. 5,348,779, in view of Li, U.S. Patent No. 6,046,262, and Biggs, U.S. Patent No. 4,436,774. These rejections are traversed.

Applicants maintain that none of Iragashi, Li or Biggs alone or in combination teach nor make obvious the present claims, and no *prima facie* obviousness is established. Applicants incorporate by reference the arguments presented in the Response mailed November 30, 2005 and add the following.

Nowhere does the art teach the use of hydrotalcite with polychloroprene. The Examiner equates the teaching of Iragashi regarding the use of polychloroprene (i.e., chloroprene rubber) at column 1, lines 31 through 33 with the use of chlorosulphonated polyethylene or chlorinated polyethylene; Applicants urge that Iragashi teaches only that polychloroprene may be used in hose covers, but teaches nothing about the use of hydrotalcite with polychloroprene. Indeed, at column 9, lines 23 through 30, Iragashi teaches that hydrotalcite may be used as an acid receptor with a "chlorinated elastomer", and then defines "chlorinated elastomer" at column 9, lines 48 through 50: "The chlorinated elastomer in which the acid receptor is dispersed is an elastomer chlorinated as a result of reaction of an elastomer with chlorine. The chlorinated elastomers may be chlorosulphonated polyethylene rubber or chlorinated polyethylene rubber." Applicants urge first that polychloroprene is not "an elastomer chlorinated as a result of reaction of an elastomer with chlorine." Instead, polychloroprene is an elastomer resulting from the polymerization of a chlorine-substituted monomer, as evidenced by the excerpt from The Vanderbilt Rubber

Handbook, 13 Ed., enclosed as Attachment A. As noted in Attachment A, polychloroprene (i.e., neoprene) is an elastomer resulting from the polymerization of chloroprene, and is not the result of a reaction of an elastomer with chlorine. Applicants urge that Iragashi does not therefore teach the use of polychloroprene with hydrotalcite, and in fact teaches only the use with "elastomer[s] chlorinated as a result of reaction of an elastomer with chlorine," which clearly excludes polychloroprene based on the teaching of Attachment A. As none of the cited art teaches or suggests the use of hydrotalcite with polychloroprene, no *prima facie* obviousness is established.

Moreover, Applicants note that the Examiner is in error regarding the assertion that polychloroprene is equivalent to chlorosulphonated polyethylene or chlorinated polyethylene. The Examiner states that "chlorinated polyethylene is a genus which contains polychloroprene since both are chlorinated ethylenes." With reference again to Attachment A, it is clear that the Examiner is in error; polychloroprene is not a chlorinated ethylene but, rather a polymer of 2-chloro-1,3 butadiene, i.e., a polymer of chlorine-substituted butadiene, and is therefore not of the genus of chlorinated polyethylene. As none of the cited art teaches or suggests the use of hydrotalcite with polychloroprene, no *prima facie* obviousness is established.

Further, the Examiner suggests that "chlorosulphonated polyethylene or chlorinated polyethylene rubber . . . are structurally similar to polychloroprene." The Examiner has provided no further evidence to support this assertion; nowhere does the cited art teach anything about the equivalence of polychloroprene and chlorosulphonated polyethylene or chlorinated polyethylene. Applicants hereby request that the Examiner provide an affidavit under 37 CFR 1.104(d)(2) to attest to the equivalence of polychloroprene and chlorosulphonated polyethylene or chlorinated polyethylene rubber. Short of this, the assertion is unsubstantiated, no cited art teaches the use of polychloroprene and hydrotalcite, and no *prima facie* obviousness is established.

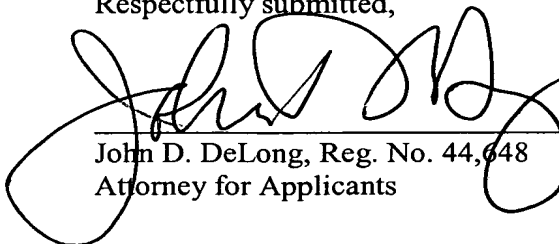
Further, the Examiner maintains that, regarding the teaching of Li about the adhesion of RFL treated fibers to fluorinated rubbers, "if the RFL treated fiber can be bounded (sic) to fluorinated rubbers, they certainly can be bonded to chlorinated rubbers for the purpose of

providing improved adhesion between the fiber layer and the rubber layer since both rubbers are halogenated." Applicants note that the Examiner is apparently relying on personal opinion to support the assertion that the adhesion of RFL treated fibers to fluorinated rubbers is equivalent to the adhesion of RFL treated fibers to chlorinated rubbers "since they are both halogenated." The Examiner has provided no evidence to support this assertion; nowhere does the cited art teach anything about the equivalence of the adhesion of RFL treated fibers to fluorinated rubbers and the adhesion of RFL treated fibers to chlorinated rubbers. Applicants hereby request that the Examiner provide an affidavit under 37 CFR 1.104(d)(2) to attest to the equivalence of the adhesion of RFL treated fibers to fluorinated rubbers and the adhesion of RFL treated fibers to chlorinated rubbers "since they are both halogenated." Short of this, the assertion is unsubstantiated, no cited art teaches the use of RFL treated fiber with a polychloroprene and hydrotalcite, and no *prima facie* obviousness is established.

Conclusion

Applicants urge that the claims are fully patentable over the cited art and respectfully request allowance of the claims.

Respectfully submitted,



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ATTACHMENT A

THE VANDERBILT RUBBER HANDBOOK



Thirteenth Edition

Edited by Robert F. Ohm

Published by



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INDUSTRIAL MINERALS AND CHEMICALS

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THE NEOPRENES

by Robert P. Kane

E. I. DuPont de Nemours & Co., Inc.
Wilmington, Delaware 19898

Neoprene is the generic name for polymers of chloroprene (2-chloro-1,3-butadiene) introduced commercially in 1931 by Du Pont. Neoprene currently is being manufactured in the United States by Du Pont (at Louisville, KY; and La Place, Louisiana) and by Mobay Synthetic (at Houston, Texas). Du Pont presently offers 24 types of solid neoprene and 9 types of neoprene latex.

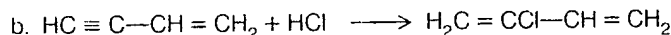
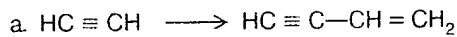
Neoprene is also manufactured by Du Pont in the United Kingdom and in Japan by Showa Denko Du Pont, via a joint venture. These plants offer products similar to those manufactured in the United States, plus some additional unique types not available elsewhere.

Other overseas producers of conventional polychloroprenes are Bayer in Germany, Distugil in France, and Denka and Toyo Soda in Japan. Manufacturing facilities are also located in the U.S.S.R and Peoples Republic of China.

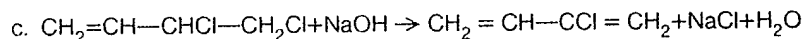
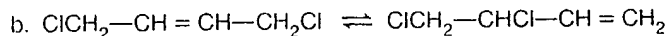
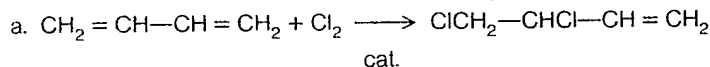
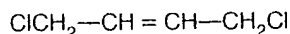
Manufacture

Chloroprene, 2-Chloro-1,3-butadiene, the monomer from which all neoprenes are made, is produced by two major processes, one using acetylene, and the other using butadiene. Today, most chloroprene is produced from butadiene.

1. Acetylene Process



2. Butadiene Process



Chloroprene is the system is also time and temperature resulting polymerization of the emulsions of chloroprene pH levels to specify The molecular structure of 2-butenylene un molecular structure the following summary neoprene polymer

Type of Additive

Trans 1,4

Cis 1,4

1,2

3,4

The 1,2 addition of chlorine available principal site of polymer largely dependent on increasing amount

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Chloroprene is emulsified in water, catalysts and modifiers are added and the system is allowed to polymerize under carefully controlled conditions of time and temperature. The reaction is terminated by short-stops and the resulting polymer is chemically stabilized. Dry polymer results from coagulation of the emulsion followed by drying. Latices, which are colloidal suspensions of chloroprene polymers, are finished and stabilized by adjustment of pH levels to specified values, usually 11 or higher.

The molecular structures of neoprene polymers are primarily of trans-chloro-2-butenylene units, but three other configurations occur. The different molecular structures and configurations of the monomer units are shown in the following summary with the approximate proportions occurring in a typical neoprene polymer.

Type of Addition	Configuration	Approximate Percent
<i>Trans 1,4</i>	$ \begin{array}{c} \text{H}_2 \quad \text{H} \\ \quad \\ -\text{C} = \text{C}- \\ \quad \\ \text{Cl} \quad \text{H}_2 \end{array} $	88-92%
<i>Cis 1,4</i>	$ \begin{array}{c} \text{H}_2 \quad \text{H}_2 \\ \quad \\ -\text{C} = \text{C}- \\ \quad \\ \text{Cl} \quad \text{H} \end{array} $	7-12%
<i>1,2</i>	$ \begin{array}{c} \text{H}_2 \quad \text{Cl} \\ \quad \\ -\text{C} - \text{C}- \\ \\ \text{CH} \\ \\ \text{CH}_2 \end{array} $	1.5%
<i>3,4</i>	$ \begin{array}{c} \text{H}_2 \quad \text{H} \\ \quad \\ -\text{C} - \text{C}- \\ \\ \text{C}-\text{Cl} \\ \\ \text{CH}_2 \end{array} $	1.0%

The 1,2 addition of 2-chloro-1,3-butadiene results in polymer having some chlorine available in allylic form. This is a labile form and is believed to be the principal site of vulcanization. The degree of crystallinity in a neoprene is largely dependent upon the amount of trans configuration in the polymer. Increasing amounts increase the degree of crystallinity.

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